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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,751	02/01/2006	Jungo Miyazaki	03500103091	7265

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EXAMINER

ZHU, JOHN X

ART UNIT	PAPER NUMBER
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2858

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,751	Applicant(s) MIYAZAKI ET AL.	
	Examiner John Zhu	Art Unit 2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 November 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,2,9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lytton (5,384,715).

With respect to claims 1 and 12, Lytton discloses aspects of the claim including a system and method of evaluation comprising oscillation means (Fig. 2, element 204) for emitting an electromagnetic wave to strike the surface of a multilayer object (102-105), reception means (205) for receiving electromagnetic waves generated by the reflection, processing means (206) for counting the number of layers on basis of the reflected signals (Column 3, lines 44-46).

Lytton does not explicitly disclose the oscillating means contains a component having a frequency in range from 30 GHz to 100 THz.

However, optimization of ranges by routine experimentation is not patently distinct when the general conditions of a claim are disclosed in the prior art. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)".

Since the frequency of transmitted signal is based on what the device under test is (i.e. higher frequency for thinner materials, etc.), it would have been obvious to modify

Lytton to include frequencies in the desired range for the purpose of penetrating and characterizing different desired materials.

With respect to claim 2, Lytton further discloses the oscillation means oscillating an electromagnetic pulse (Column 1, lines 42-43), and the count is on the basis of the counted number of electromagnetic pulses received (Column 3, lines 44-46).

With respect to claim 9, Lytton further discloses propagation means (Isolator 203) for propagating the signal emitted from the oscillating means through a propagation route getting to the reception means.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lytton (5,384,715) as applied to claim 1 above, and further in view of Bible et al. (5,384,543).

With respect to claim 3, Lytton does not explicitly disclose oscillating a continuous wave and count the number of layers based on the detected phase shift.

Bible disclose that the reflected rays (Fig. 2) at each interface define a vector that "varies in amplitude and phase angle depending upon the path length, the number of reflections of the ray and the distance of the penetration" (Column 4, lines 10-13). Bible further discloses applying a continuous signal (column 2, lines 49-54) and detecting phase differences of the reference and reflected signals to determine variations in the material. Although Bible does not explicitly disclose counting the number of layers, the phase delay supplies necessary information indicative of this data.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lytton include a continuous signal and phase detection system as taught by Bible for the purpose non-destructive evaluation of structural characteristics such as size and location, etc. (column 1, lines 18-21)

4. Claims 4, 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lytton as applied to claim 1 above, and further in view of Bible and Wochnowski et al. (5,086,279).

With respect to claim 4, Lytton discloses all aspects of the claim except for second reception means for receiving transmission through the layer, and second processing means for detecting a phase shift of the transmitted and reference waves to determine the number of layers.

Wochnowski discloses second reception means (28) that detects the signal of the wave transmitted through the layer (1) and second processing means (11) that detect the phase shift of the transmitted (128) and reference (29) waves.

Bible discloses the phase shift of a test wave and reference wave contains information regarding the number of layers of device under test ("interface reflections", see the rejection of claim 3 above).

All of the elements are known in Lytton, Bible and Wochnowski. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the second reception means and processing means as taught by Wochnowski and the phase shift information as taught by Bible into the device of Lytton

for the purpose of achieving a more reliable and accurate system that takes into account both reflected and transmitted waves.

With respect to claim 5, Lytton discloses emitting electromagnetic pulses (Column 1, lines 42-43) but does not explicitly disclose the second reception means has processing means for detecting a delay time between the transmitted wave and the wave detected when the multilayer object does not exist (also read as reference wave), and counting the number of layers based on the detected delay time.

However, this is the same principle Lytton uses in determining the number of layers and thickness of layers (reflected waves' peak values and delay time between transmitted wave and wave when multilayer object does not exist (reference wave), column 3, lines 44-51). Also, the relationship between the thickness and number of layers is well known for homogenous layers.

Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made modify Lytton use the detected delay time to achieve the predictable results of determining the thickness and number of layers of a multilayer object.

With respect to claim 10, although the references do not explicitly disclose a plurality of the means used for counting the number of layers at a plurality of positions, duplication of parts is not patentably distinct unless a new and unexpected result is produced. See *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a plurality of means for the purpose of backing elements in the case of mechanical failures.

5. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wochnowski et al. (5,086,279) and Lytton.

With respect to claims 6 and 7, Wochnowski discloses oscillation means (6) for emitting wave to an object (1), reception means (11) for receiving the wave transmitted through the object, a processing means (13) for detecting a phase shift (equivalent to delay time) of the transmitted wave relative to the wave that is detected when the multilayer object does not exist (reference wave) (Column 5, lines 23-27).

Wochnowski does not explicitly disclose determining the number of layers based on the phase shift or emitting a pulse. Wochnowski also does not explicitly disclose the oscillating means contains a component having a frequency in range from 30 GHz to 100 THz.

However, optimization of ranges by routine experimentation is not patently distinct when the general conditions of a claim are disclosed in the prior art. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)".

Since the frequency of transmitted signal is based on what the device under test is (i.e. higher frequency for thinner materials, etc.), it would have been obvious to modify Lytton to include frequencies in the desired range for the purpose of penetrating and characterizing different desired materials.

Lytton discloses emitting an electromagnetic pulse (Column 1, lines 42-43) and determining the thickness of layers based on measured delay time (column 3, lines 44-51). Also, the relationship between the thickness and number of layers is well known for homogenous layers. One of ordinary skill in the art would recognize this would also apply to transmitted waves in addition to reflected waves as the principle behind measuring delay time is the time a wave is delayed in any medium.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wochnowski to calculate the thickness of the layers via phase shift/delay time based on pulse emitted as taught by Lytton, and apply well known relationship between thickness and number of layers to determine the total number of layers.

With respect to claim 8, Wochnowski further discloses dividing means (in source 6) to divide the wave into a first wave (from 7) for striking the object and another wave (via line 12) to reception means.

Response to Arguments

6. Applicant's arguments filed 11/22/2007 have been fully considered but they are not persuasive. Applicant states with respect to the rejection of claims 11 and 13, *"Lytton is seen to be directed to determining "material characteristics of individual layers" (column 1 lines 6 to 7). As such, Lytton's system is not seen to relate to using "higher frequency for thinner materials"."* (Remarks, page 10, paragraph 3). The

examiner respectfully disagrees and maintains the rejection. Notice is drawn to the disclosure of Lytton, which indicates that material characteristics of the layers include the number of layers, "*the number of peaks in a reflected signal indicates the number of layers comprising the pavement system*" (Column 3, lines 44-46).

The rejection is made under 35 USC 103 which recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the teaching is from the knowledge generally available to one of ordinary skill in the art - higher frequency is generally used to gauge thinner materials. This is also supported by the De Meurechy reference cited below.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. De Meurechy (US PG Pub no. 2006/0288756 A1) discloses a method and apparatus for scanning corrosion and surface defects comprising using higher frequencies which will create a clearer resolution of thin material (Paragraph 0080). Zoughi et al. (5,539,322) discloses a microwave dielectric coating thickness gauge that counts the layers of paint and also uses a microwave frequency range between 10 and 30 GHz (Column 3, line 57).

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Zhu whose telephone number is (571) 272-5920. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Hirshfeld can be reached on (571) 272-2168. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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JZ

John Zhu
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